REMARKS

The Office Action of April 25, 2001 has been carefully considered. In response thereto, the claims been amended as set forth above. Reconsideration and allowance of the present application in view of the following remarks is respectfully requested.

Claims 1-8 were rejected as being anticipated by numerous references, including Alberkrack, Borras, Bates and Fukuda. These claims have been cancelled. New claims 9-12 have been added. Reconsideration is respectfully requested.

The invention, described concisely in legal terms in claims 9-12, may be described less formally as follows. In a frequency divider including a multiple-modulus prescaler controlled by a modulus control signal, where a desired divisor N is obtainable by causing the control signal to transition some small number (15) of times per period of the output signal, instead, the same divisor is obtained by causing the control signal to transition a much greater number (30) of times during a period of the output signal. The effect is to remove noise from the frequency band of the output signal. In the example of Figure 5 of the specification, instead of the modulus control signal transitioning once per period of the output signal (left-hand side of figure), the modulus control signal transitions approximately 30 times per period of the output signal. This difference in operation produces a dramatic difference in noise characteristics, as presented in Figures 8 and 9 of the specification.

In accordance with the language of the new claims, the modulus control signal is caused to transition a larger number of times than required to obtain division by N. Referring

again to the example of Figure 5 of the specification, division by N could be obtained in conventional fashion (left-hand side of figure) in which the modulus control signal transitions only a single time per period of the output signal. In other examples, to obtain a particular desired N, it may be required to cause the modulus control signal to transition several times or even many times per period of the output signal. In accordance with the language of the claims, in the invention, the modulus control signal is caused to transition *more than* the minimum required number of times to obtain a particular desired N.

The prior art references, although they may address the general area of frequency dividers, lack any teaching of the features of the invention set forth in the newly-presented claims.

In particular, Alberkrack describes a frequency divider arrangement for use in a TV tuner (col. 1, line 21) in which a mathematical relationship is obtained between TV channel number and corresponding counter value pairs, allowing a ROM storing only four pairs of numbers to generate 82 different frequencies corresponding to each each of the 82 television channels (col. 5, lines 1-3). In addition, a look ahead arrangement is used to allow a single counter to be used instead of two physical counters. Nevertheless, the modulus control signal transitions only a single time during one period of the output signal, as illustrated in Figure 7 of Alberkrack. The waveform labeled " ÷ 2" is the modulus control signal, as may be verified with reference to the cover figure (Figure 3). Note that this signal transitions only once during a period of the output signal.

Similarly, Borras does not contain any more pertinent teaching than Alberkrack. Attention was drawn to Figure 2. Again, a single counter is used instead of two counters, as

explained at col. 5, lines 33-44. Although no timing diagram is provided, there is no indication that operation is significantly different than that illustrated in Alberkrack; that is, the modulus control signal transitions only once during a period of the output signal.

As for Bates, the description of operation of the dual-modulus prescaler found at col. 4, lines 25-55, is not substantially different from that found the BACKGROUND portion of the present specification. The only departure in Bates from wholly conventional practice is the use of multiple BCD switches allowing for a desired frequency to be set manually by an operator.

Fukuda addresses the problem achieving both high-speed lock-up (frequency acquisition) and highly stable oscillation (tracking) by providing for both high-speed and low-speed operation and selecting between the two. High-speed operation allows for rapid frequency acquisition, and low-speed operation allows for stable frequency tracking.

As described in the ABSTRACT, high-resolution division is achieved using fractional N, or dual-modulus, techniques. In particular, a conventional frequency divider illustrated in Figure 5 of Fukuda is used to realize the "A counter" 21 of Figure 2 of the same. Furthermore, the fractional divider 2 of Figure 2, although seemingly of unconventional arrangement, is actually quite conventional. The A counter 21 and the incrementer 22 together realize a dual-modulus prescaler, which is controlled using two counters, an F counter 23 (corresponding to the R counter of prior art Figure 3 of the specification, for example) and a fixed 8 counter 24 (corresponding to the Q counter of Figure 3 of the specification). In Fukuda, a fixed counter 24 may be used because a continuous range of divisors N is not required; a particular set of choices of N is sufficient. Once again, there is no indication that operation is sig-

nificantly different than that illustrated in Alberkrack; that is, the modulus control signal transitions only once during a period of the output signal.

Accordingly, none of the prior art references relied upon is believed to teach or suggest the essential features of the present invention as set forth in claims 9-12.

Notice of allowance is respectfully requested.

Respectfully submitted,

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